User's Manual of "Vind®" Wind Turbines

Please Read This Manual Carefully before Installation

(**Apply to**)

NW2.0-0.6 Series

NEOENERJI Clean Energy

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Thanks for choosing Our "Vind®" Wind turbines. Before your installation or using of these products, please read through this manual carefully. This will help you use these products safely, and efficiently. Honestly hope you enjoy the convenience by using our "Vind®" Wind turbines.

This manual is updated in August, 2011, file number is: 0NEO.466.001. If there's any further modification of specifications of this manual, please refer to www.neoenerji.com for downloading. Sorry for any inconvenience we could bring you.

Part 1) Brief introduction to "Vind®" Wind Turbines

Wind Turbine is an electrical device that transforms wind energy into electrical energy. Neoenerji Company's wind turbines are popularly welcome in many territories due to its high stability, high efficiency, modest design.

Wind Wheel: wind wheel is the main parts of wind turbine to capture wind energy. Neoenerji Company holds a dozen of patents on the design of blade and manufacture art. The wind wheel, with low start-up and cut-in wind speed, high aerodynamic efficiency, will go to speed-loss working condition in strong wind, which helps to lower down the possibility of "out of control", as a matter of which will damage the blades. Our blades, which are made of high strength fiber glass, adopt new RTM technology, along with vacuum industrial art, and thus, guarantees the blades won't be damaged under extreme wind at 35m/s.

Synchronized Permanent Magnetic Generator (hereinafter called PMG): PMG is the key parts of wind turbine. Our PMG use tombarthite as permanent magnetic material. Our PMG, with small size, low weight, high efficiency, low starting torque, have adopted many advanced technology, so it can be started with low wind speed.

Wind Turbine Unit: Our wind turbine have a long lifespan by using superior Aluminum Alloy, adopting accurate die-casting technology, anticorrosion technology on connecting bolt & shaft, and is suitable for all kinds of circumstances.

Photograph of "Vind®" Wind Turbine

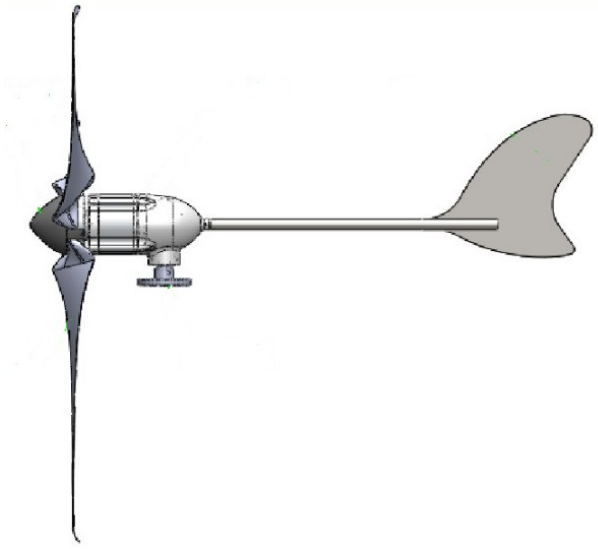


Chart 2 Illustration of wind turbine with flange

Part 2) Select an installation area

The location where wind turbine will be installed, have an important effect on the usage and effectiveness of the wind turbine. Here's some aspects have to pay attention to:

a) **High annual average wind speed**

Output Power generated by wind turbine is in proportion to the cube of wind speed. So, the higher average wind speed is, the more electrical energy will be generated, the shorter the period for recovery of investment, the better economic benefit it will be. In this case, we should choose a good spot with high horizon and high average wind speed, also there should be no big barriers around wind turbine. On flat floor, the suggested height of tower should be no less than 8 meters.

b) **Low turbulent environment**

The flow factors such as air velocity, air pressure changes randomly along with time and space. The disordered, circuitous tract of air molecule blends together, forms air turbulence. Working in turbulent area is very harmful to wind turbine, lower down the lifetime of wind turbine, maybe even damage it. In case of this, wind turbine should not be installed in circumstances where there's many cluttered buildings, trees, etc.

c) **Keep distance from resident**

There will be some certain noise while wind turbine is working. To avoid influencing people's normal working and living, wind turbine should be installed as far away from resident where people live and learning as possible.

d) **Comply with local laws and regulations**

Any individual or organization who use wind turbine should follow the laws and regulations in local territory.

Part 3) Advantages of "Vind®" wind turbines

*Low starting wind speed,
*High efficiency wind power,
*Small volume,
*Graceful sharp,
*Low noise,
*Installation using humanized,
*Blades are Leaf structure under aerodynamic design, wind energy utilization, increasing the amount of annual power generation,
*Blades with high-quality fiberglass material, wet corrosion, anti-aging,
*Blades has the characteristics of low wind start, vibration and low noise, reduced wear and tear.

Part 4) Specifications and performance of "Vind®" wind turbine

A. Specification of "Vind®" Wind turbine

MODEL NO.	NW2.0-0.6
RATED POWER	600W.
RATED VOLTAGE	28/14VAC
START UP WIND SPEED	2.1m/s
CUT IN WIND SPEED	2.9m/s
RATED WIND SPEED	10.8m/s
CUT OUT WIND SPEED	19.6m/s
MAX. WIND SPEED	49.1m/s
RATED ROTATION	560RPM
ROTOR DIAMETER	2m.
ROTOR MATERIAL	VER&FRP
ROTOR MADE ARTWORK	RTM
GENERATOR	3 PHASE PMG
LIFE TIME	20 YEARS
BATTERY VOLTAGE	24/12VDC
MATCHED BATTERY	2*12V/100AH(optional)
MATCHED TOWER	6m. (optional)
MATCHED CONTROLLER	WOFC0.8-24 / WOFC0.5-12
WEIGHT	15.6KG
SPEED REGULATION	Electromagnetic Brake+Mechanical Yawing+Ratio Stall

B. Wind speed – power output curve of "Vind®" wind turbine

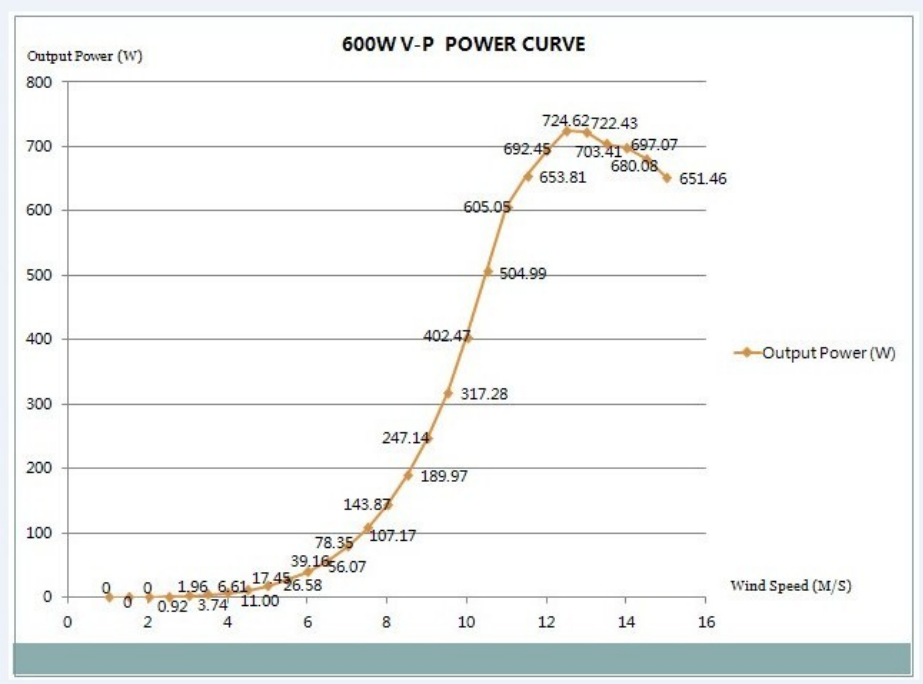


Chart 6 NW2.0-0.6 Curve

Part 5) Preparatory work before installation

a) Select installation spot, prepare the foundation (to fix the tower)

According to the installation requirements, confirm the location where wind turbine will be installed. To install the tower, it's better to choose mudstone geology environment. The length, width and depth of fundamental pit should be more than 1/6 ~1/10 of the height of tower. First put the steel reinforcement cage which connect with the flange of the tower in the pit, then pour concrete into the pit (The proportion of concrete is C10 to C20). Normally the curing period of concrete is 100 hours, do not install the tower within the curing period of concrete. The levelness of the flange of the steel reinforcement cage should be in horizontal, and keep it 30 to 100 cm higher to the ground. Wind turbine that installed on fishing boat should be in high stability. Remember to preset outlet of wires for the wind turbine.

b) Prepare the tower and relevant parts

Please check carefully the tower, controller, inverter, protection bush and wires before installation.

c) Prepare batteries

Prepare batteries, and do initial charges to comply with technical regulations.

d) Prepare tools, instruments and relevant materials

For tools, instruments and materials that is needed in installation, please refer to the follower form.

Tools list for installation				
No.	**Tools**	**Quantity**	**Specifications**	**Remark**
1	Internal hexagonal wrench	1	8 in 1	For wind turbine installation
2	Shifting wrench	1	12"	For wind turbine installation
3	Steel measure tape	1	3m	For wind wheel installation
4	Wire stripper	1		For connecting wires
5	Nipper pliers	1		For connecting wires
6	Insulating tape	1		For connecting wires
7	Multi-meter	1	Standard	For checking circuit
8	1.5m holder	1	handmade	For wind turbine installation
	Wires	1	3*φ1.5mm ^{2}	
9	Hemp rope	3	¢30/15m	For tower/pole installation
10	Plain end screwdriver	1	Big/medium/small	For tower/pole installation
11	Cross screwdriver	1	Big/medium/small	For tower/pole installation
12	Leveling instrument	1	3m	For checking verticality

e) Open the package and read the manual carefully

Open the box, check the parts according to parts list, and read the manual carefully.

f) Confirm the installation spot

g) Prepare equipment that is needed during installation

1. Prepare crane or other vehicle to install large tower or wind turbine.

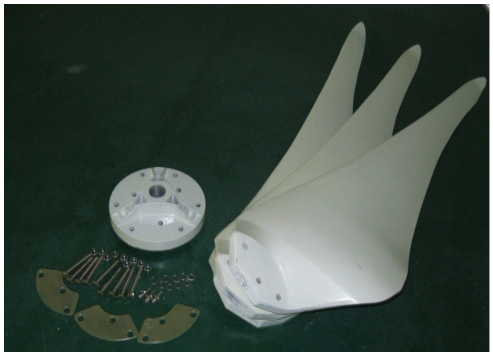
2. Prepare relevant bracket, holder and rope that are needed.

Part 6) Installation of wind turbine

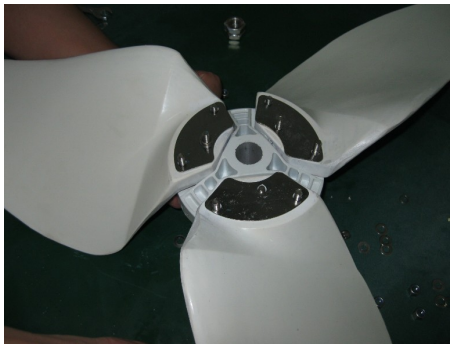
a) Install in sunny days when there's no wind or wind below degree 2. Install in high windy days is strictly prohibited.

b) Step of installations：

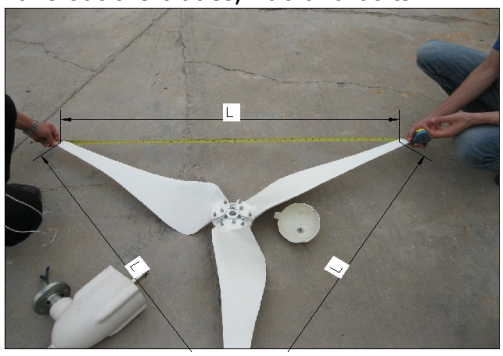
1.Check all parts in carton



2. Take out the blades, hub and bolts



3. Fix blades to the hub initially

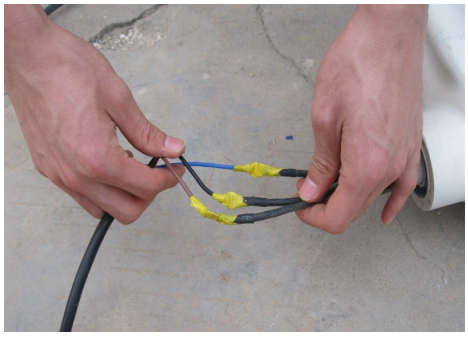


4. Make sure the length between every tip of the blade is the same.

5. fasten all 9 bolts

6. Put wires through the tower

7. Connect the wires between tower & PMG



8.Cover the connect point with insulating tape

9. Connect the flange with bolt

12. Fix the flange

10. Take of the cover on shaft

11. Short-circuit the three wires of PMG and fasten the wind wheel to the main shaft

12. Fasten the nose cone

13. Rotate the rotor and main body to make sure it work

Part 7) Do and don't in using

A) Principle of using

1. Wind turbine should be installed in an open area where there's no block.

2. The AC generated by off-grid wind turbine is converted into DC by controller, and charge the battery group. Battery is a device that store electrical energy, and the system will get energy from battery while there's no wind. So battery should be charge once the voltage is low, especially the Acid-lead battery. Remember not to overcharge of over discharge the battery, otherwise the lifespan of battery will go

down. So, users should adjust electricity consumption according to local wind conditions and wind turbines output.

3. The 3 phase AC current generated by wind turbine is rectified into DC by bridge type rectifier in the controller, normally DC12V~DC14V (1 piece of 12V battery), or DC24V~DC28V (2 pieces of batteries). The whole system will get best efficiency when battery voltage should comply with DC voltage of wind turbine.

4. The input DC voltage of inverter should in accordance with wind turbines working voltage.

5. According to different requirements, the electric case should have both DC and AC output and be labeled. Be cautious while using AC200V.

B) Safety matters

1. Wind turbine working under no-load or continuous rotating speed is prohibited.

2. Check the holders regularly, if the bolt become loose, should be maintained immediately.

3. People is not allowed to stand under wind turbine when the wind wheel is in high rotating speed.

4. When the wind is predicted to be large than 10 grade, please stop the wind turbine by hand in time, and put the wind turbine onto ground.

5. Whenever there's abnormal noise or vibration while wind turbine is working, it should be stopped and checked.

6. The charging line of wind turbine should be unique, and cannot mix with other wires; it's more economic to use DC power on lamps; house hold appliances use AC power converted by inverter, and refrigerator should be plugged in to special plug seat with power-on-delay functions.

7. The battery should be connected first and later with output wires of wind turbine. When disassemble the system, should disconnect the output line of the wind turbine, and then batteries.

8. Always put the switch on the controller at "OPEN". This can be switched to "Close" only when batteries are fully charged or to avoid storms. Never switch this button when there's strong wind.

9. Batteries should be kept away from fire, heating places. The harmful gas generated while charging should be let out.

C) Keep the balance of the wind wheel

If there's any imbalance of the blades due to external damage, and lead to violent vibration, the device should be stopped and maintained immediately. To disassemble the wind wheel, you need firstly remove the nuts and gaskets at both ends of the shaft, using wrench to set the screw M16×100, and remove the wheel off the shaft (see picture 8). The imbalance torque of the wind wheel should not be larger than 0.05N-M after maintenance.

Part 8) Maintenances in lifespan

A) Maintenances：

1. The shaft and rotatable parts should be examined by visual inspection or voices inspection, to find out the unusual situation

2. All fastening parts should be washed and spread with antirust oil before rainy season every year.

3. All main shaft and rotatable parts should be lubricated every 3 years.

4. Every outer part should be cleaned, anti-dust, antirust and painted.

B) Breakdown maintenances and elimination

Our wind turbine is designed and manufactured with advanced technology, correct installation and use won't lead to breakdown. In case of device breakdown, please refer to the following form:

Breakdown	Reasons	Methods to maintain
Severe vibration	1、Connecting parts loose 2、Fixed bolt loose 3、Blades damage 4、Blades iced up	1、Fasten the bolt 2、Replace new blades 3、Clean the ice
Not yawing	1、Breakdown of shaft of yaw body 2、Collecting ring breakdown	1、Maintain or replace the shaft 2、Repair or replace the collecting ring
Abnormal noise	1、Fixed bolt loose 2、Shaft loose 3、Shaft damage 4、Attrition between parts 5、Rotor damage	1、Check and fasten the bolt 2、Check an maintain the shaft 3、Replace the shaft 4、Check and maintain 5、Replace the rotor
Rpm goes down	1、 Rotor breakdown 2、 Shaft damage 3、Short circuit 4、Button on "Close"	1、Replace the rotor 2、Replace the shaft 3、Check and repair the wires 5、Switch the button to "Open"
Low output voltage	1、Low wind speed 2、Rotor's demagnetization 3、Short circuit or imbalance between phases of the generator 4、Bad connection in collecting ring 5、Short circuit in rectifier 6、Wires too long under low voltage.	1、Check the wind condition 2、Replace the rotor 3、Check and repair the wires 4、Clean the collecting ring 5、Repair the rectifier 6、Shorten the wires, replace for wide wires
No output ampere	1、Open circuit 2、Output wires damage 3、Stator windings damage	1、Check and repair the circuit 2、Check and reconnect the wire 3、Dismantle and repair the stator
Normal AC output, but no DC output	1、Output wires damage of rectifier 2、Rectifier breakdown	1、Check and reconnect the wire 2、Replace the rectifier controller
Battery low Output	1、Generator's low voltage output or no output 2、Bad connection of battery wires 3、Battery failure	1、Check the above and repair 2、Clean the connection point and repair, and paint protection oil 3、Replace battery